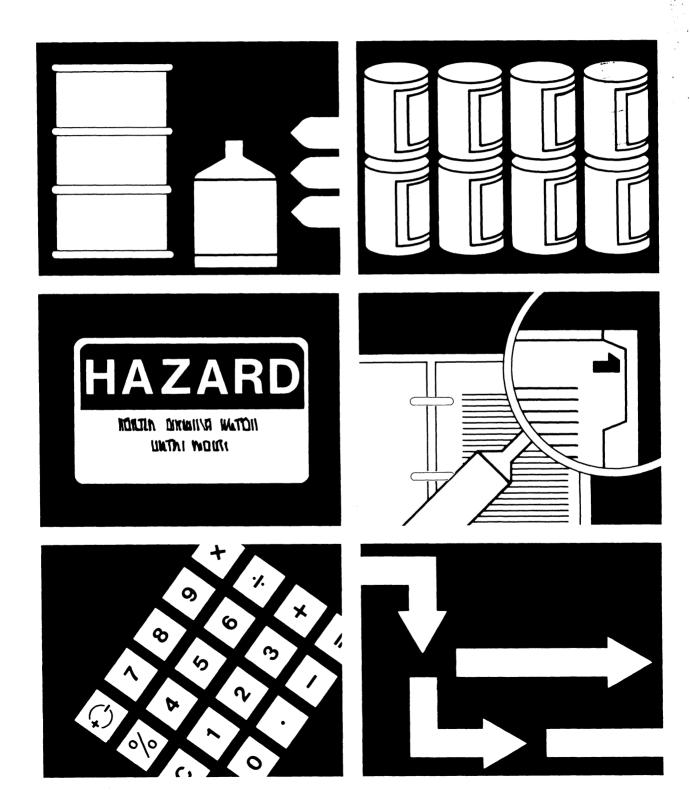


Food Safety and Inspection Service

Agriculture Handbook Number 612

Quality Control Guidebook

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This guidebook is designed to assist meat and poultry processors who would like to (1) develop quality control procedures; (2) document, improve, or expand present quality control procedures; and/or (3) request to participate in the voluntary Total Quality Control (TQC) Inspection Program offered by the U.S. Department of Agriculture.

Completion of the 12 tear sheets provided in this guidebook will provide firms that do not have quality control programs with a comprehensive record of operations. Firms with quality control programs already in place can use the data as a guide for improving or expanding these programs. In addition, plants may wish to use the documents as a starting point for participation in the TQC Inspection Program. The quality control guidebook explains the application process and suggests how the assembled information might be used in applying to the program.

The bibliography lists several quality control and management-related publications. Although key ideas from these articles are included in the guidebook, use of this material does not imply USDA endorsement over other similar or equally effective material.

If you wish to obtain additional copies of this guidebook, write to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. In addition, operators of small processing plants who want to participate in the voluntary TQC Inspection Program may wish to refer to another GPO guidebook, Quality Control in Small Plants.

Introduction

In every meat and poultry processing plant there is some type of quality control activity. In a small plant, it may be as simple as slicing meat products during operations and cleaning the equipment and floor at the day's end. Or it may be more comprehensive, calling for supplier process control, continuous closed processing systems, and computerized inventory controls.

While there are as many variations in quality control systems as there are plants that use them, there is one common denominator throughout—quality control is good business. Many processors have found it can reduce product costs, control product uniformity, and help manage business. Moreover, by increasing controls over ingredients and processes, quality control can ensure compliance with company specifications as well as regulations enforced by USDA.

In addition, processors may use quality control to ensure compliance with Federal meat and poultry inspection laws. To qualify for participation in the USDA Partial or Total Quality Control Inspection Programs, quality control systems must be designed to assure production of safe, wholesome, unadulterated, and accurately labeled meat and poultry products.

This guidebook does not limit the discussion of quality control to assuring compliance with meat and poultry inspection regulations. That is because USDA recognizes that when processors manage the production of food products from the origin of raw materials to the distribution of packaged products, many mistakes can be prevented. Along with the ability to reduce error, quality control also enhances the processor's ability to conform to predetermined specifications and to satisfy customer demands. The result is increased plant productivity.

The meaning of quality varies with the standards of the manufacturer and the opinion of the user of a product. Advertising claims or a company logo may refer to quality without defining the real meaning. The logo may imply a superior product, or label claims may be made about the performance of the product.

One aspect of quality can be measured by the level of excellence desired by the manufacturer. Customers often identify it in terms of a brand name, and they judge it relative to a similar item from another manufacturer.

Another aspect of quality is conformance—does the product meet specifications or standards? Plants with the capability of conforming to these criteria can produce a uniform, consistent product without making mistakes. Being able to operate without error translates into less waste, improved customer satisfaction, and the control of production costs.

There are other aspects of quality which may be hidden from the casual observer. For example, the time it takes to produce a product and distribute it to the customer must be taken into consideration to assure the product remains fresh. Longer shelf life contributes to product quality because of increased durability of goods.

Ultimately, the quality of the product is determined by the user. By knowing whether the product meets the customer's expectations and needs, the manufacturer can adjust the product accordingly. Users may measure quality by the product itself, by how it is used, or by the manufacturer's instructions. Controlling product quality must begin in the planning stages to ensure the users' needs are met.

Quality Control Strategy

There are several approaches to quality control. In the "customer reactive" approach, plants do not take any special measures during production to control product quality. Rather, changes are made only in response to customer reaction. On the other hand, the "manufacturer reactive" approach includes preventive measures during processing, such as product testing and inspection. Finally, in the "preventive" approach, plants take specific measures during production to prevent mistakes and ensure products will meet consumer expectations. Plants approved for participation in the USDA TQC Inspection Program use the "preventive approach.'

Quality control systems can be designed to achieve multiple goals. Depending on the nature of its processing operations and the extent of product distribution, a firm may benefit from a broad system of quality control. For instance, some of the following might be considered under comprehensive systems:

Meat and Poultry Inspection
Regulations
Product Liability Law
Corporate Directives
Marketing Strategies
Linear Programming
Product Uniformity
Product Durability
Residue Testing
Mean Time Between Maintenance
Recall Procedure

On the other hand, quality control systems can be designed to assure only compliance with meat and poultry inspection regulations. Obviously, these systems do not offer the full advantages of quality control. However, they may be appropriate for very small plants where there is not enough time to monitor a comprehensive system. In smaller plants. responsibility for quality control can be assigned to persons who have other duties. However, there are risks with limited systems: experience shows that inadequate planning and control of operations is a major cause of small business failure.

Whether limited or comprehensive, a quality control system is em-

bodied in the written record of what actually occurs in the plant, checks for weaknesses in the plant's procedures, and compliance with a manual of operations. As experience is gained from the written controls, the system may be improved from time to time by focusing on "hot spots" which are responsible for the major problems, revising specifications, or upgrading to include sensitive testing devices.

The quality control system can have several adjuncts. One example is product liability law, which is not only of vital interest to domestic marketing strategy, but also to the worldwide marketing of value-added products. Liability claims can be based on poor design; faulty manufacture; inadequacies in packaging and labeling; and problems associated with the distribution, sale, or use of products. Plants might consider transferring product liability for proprietary components to the vendor.

Another adjunct to the system might be marketing strategy. Marketing schemes may be targeted to the customer's state of mind, values, or lifestyle. For example, marketing activities could be directed toward the customers who buy generics, toward customers who want others to think highly of them, or toward customers who buy to suit their own needs.

Still another adjunct to the quality control system might be onsite control of suppliers' materials. Blind faith in the supplier's products may not be good enough. There should be verification of suppliers' goods and services. Where proprietary products are furnished by suppliers, it may be necessary to conduct formal acceptance procedures at the point of origin. This may be especially important with unreliable suppliers or with new suppliers without a history of manufacturing products of good quality.

Inspection at the receiving point is designed to monitor or audit the receipt of materials. It should turn away unwholesome or misbranded raw materials. The level of receiving inspection may vary among plants according to the volume or dollar amount of raw materials purchased. In very small plants it may not be possible to use sampling plans; other plants may be able to use statistical sampling. Larger plants may be able to rely on the supplier's own quality control and waive receiving inspection.

A vendor rating system can be part of the quality control system. Vendors might be rated as approved, conditionally approved, or disapproved. It may be possible to accept deliveries from approved vendors with only minimal receiving inspection. Any inspection time not used for checking deliveries from these approved vendors can be allocated to other activities in the plant.

Finally, procedures to recall defective products that are in commerce may also be part of the quality control system. Planning of recall procedures can protect the assets of the organization, protect the user, assure compliance with legal and regulatory requirements, and remove unacceptable or questionable product from the market at minimum cost and inconvenience to the customer.

Management's Role in Quality Control

A positive attitude by plant or corporate management toward quality concepts provides the key to the success of quality control. Without management support, quality control systems will be weak. Plant personnel who sense a lack of commitment to quality by top management are likely to lack motivation for reducing waste, mistakes, and rework, and for improving their performance.

In order to understand management's role in quality control, it is necessary to understand management. Top-level managers respond to the money aspects of the organizationprofits, sales, and return on investment. On the other hand, lower levels of management respond to the material production of the organization pounds of patties, packages of franks, number of hams, or units per minute. The quality control department must bridge that gap—converting products to money when talking with top-level managers, and money to products when talking with lower management. Whether the language is in terms of money or products, it translates into the ability to meet customer demands.

Traditionally, management training in the United States has not focused on the use of statistical techniques. As a result, many managers feel uncomfortable with quality control—which depends so heavily on the application of these concepts—and delegate this responsibility. It is

managers, however, who ultimately are responsible for product quality. Therefore, managers must accept the use of statistical techniques.

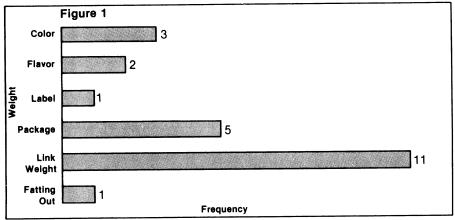
Managers are not required to use expensive methods to bring about flawless factory operations and products. Experience has shown that paying close attention to the basics and doing a good job with the plant's production of products can yield rewards equal to those generated by more sophisticated approaches. Simple quality control techniques are valuable to managers no matter how basic the plant operation.

Quality control systems generate reports and records. The records indicate when the plant is operating smoothly and when trouble is occurring. Managers, however, can fail to take full advantage of the potential for problem solving by giving inadequate attention to plant records. If records are simply filed away, an important management tool is lost.

One way to review records is to look at those aspects of production most likely to cause problems. For instance, a plant's problems with hot dogs may stem from a few major causes. By concentrating on the major problems and controlling the causes, improvement can be rapid. Figure 1 illustrates a hypothetical set of hot dog production problems, showing number and frequency of nonconformances.

To help you develop a quality system, a series of tear sheets is provided in this guidebook. Record your entries. Then remove the tear sheets from the guidebook and assemble them to comprise an outline of the quality system. If the tear sheets reference too much material, eliminate that which is not applicable to the plant's production system. If additional material besides that included in the guidebook is needed to outline the plant's operation, record it and attach it to the outline.

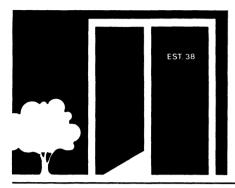
After you have completed the tear sheets, refer to page 51 if you wish to apply for participation in the voluntary TQC Inspection Program. For information on the more than 40 Partial Quality Control Inspection Programs offered by USDA, contact: Food Safety and Inspection Service, Processed Products Inspection Division, Rm. 2159-S, USDA, Washington, D.C. 20250, (202) 447-3840.



In figure 1, link weight and package weight contribute the majority of non-conformances. Therefore, the greatest potential for reduction of nonconformances is with these two problem areas.

Steps in Developing a Quality Control System

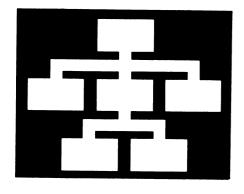
Step 1—Plant Profile



Start the system by listing the basic information applicable to the plant operation. Since the plant is operational, the requirements for Federal inspection already have been met.

| (Establishment) | | (dba) | | | | |
|---|-----|--|----|-----|--|--|
| (Address) | | (City) (State) (Zip) | | | | |
| (Establishment No.) | | (Grant of Inspection Date) Combination Slaughter/Processing | | | | |
| Processing Only | | | | | | |
| Number: Production Employees | | Quality Control Employees | | | | |
| Contractors: Sanitation Pests Maintenance Equipment Production Laboratory | | PLP (Product Liability Prevention) Consultants/Outside Labs: Micro | | Yes | | |
| (Other) No Plant Laboratory: AOAC Rapid | Yes | Analytical Analyses | | | | |
| Micro Fat Water Protein Residue | | Water Potability Certificate: Municipal Plant Wells Condenser Ice (Off-premise) (Other) | | | | |
| (Other) Waste Disposal: Municipal Plant Inedible (Other) | | Meat/Poultry Sources: Plant Other Domestic Foreign Suppliers Manual | No | Yes | | |
| CIP Systems | | GMA(Other) | | | | |

Step 2—Plant Management



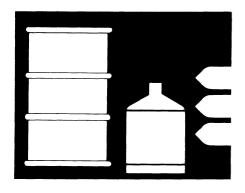
List the titles of plant management in order from the plant manager (or corporate head) to the person(s) who will be making the quality control checks. The meat and poultry inspection regulations for the TQC Inspection Program distinguish between plants which have one or more full-time persons whose primary duties are related to quality control and those plants which do not have full-time quality control personnel.

The regulations do not prohibit plant quality control personnel from reporting to production managers. In these situations, however, the system must include adequate safeguards to control product that is out of compliance with USDA inspection requirements.

Complete the entries on this tear sheet and connect with lines or arrows the line of authority among plant officials.

| Figure 2 | | | |
|-----------------------|-----------------------|------------------|--------------|
| | | (Other Co | rporate) |
| | | (Corporate Head) | |
| | (Plant M | anager) | |
| - | (Asst. Plant Manager) | | |
| (Production | Manager) | (Quality | Manager) |
| (Asst. Prod. Manager) | | (QA Manager) | (QC Manager) |
| (Prod. Foreperson) | | (QA Person) | (QC Person) |
| (Other Production) | | (Other QA) | (Other QC) |
| | (Laboratory Manager) | | |
| (Other | Lab.) | (Other Lab.) | |

Step 3—Raw Materials



Develop a list of all raw materials and supplies received by your plant. This list is important since the use of poor quality materials can affect the end quality of your product.

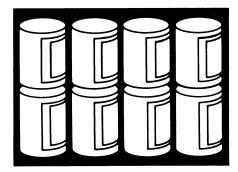
If the plant is a combination slaughter/processing operation, treat the product from the slaughter area as product from an outside source. Also, products or raw materials from other plants in the same corporation should not be accepted without evaluation.

If, when completing the tear sheet, you encounter some items that are not routinely tested or certified, identify those items in the margin. The Quality Control Guidebook was designed to cover virtually all aspects of a plant's operation. Therefore, it is likely that, as you progress through the guidebook, areas that may appear to have been overlooked in one tear sheet will be found in another.

| Food | | Raw Materials | | | |
|------------------------|---|---------------|--------------|---------------|-------------------|
| Meat/Poultry: | | Enzymes | | Casings: | |
| Chicken | | Bread/Batter | | Artificial | |
| Turkey | | Vinegar | | Collagen | |
| Fowl | | Vegetables | | Other: | |
| Giblets | | Fruits | | | |
| Pork | | Cereals | $\bar{\Box}$ | | |
| Beef | П | Gelatin | | | |
| Veal | | Soy Products | | | П |
| Lamb/Mutton | | Starch | | | |
| Goat | | Mustard | | Nonfood | |
| By products | | Corn Syrup | | Nombod | |
| Cured | | G.S. Solids | | Food Contact: | |
| MSS/MDP | П | Sugar | | Containers: | |
| Lard | П | Dextrose | | Metal | |
| Suet | | | | Glass | |
| Other Fat | | Honey | | | |
| Rework | | Yeast | | | |
| Casings (Natural) | | | | (Other) | |
| Casings (Natural) | П | Flour/Dough | _ | | |
| | | Cheese | | Packaging: | |
| (Other) | | Cheese Food | | Plastic | |
| (311131) | | Bacteria | | Paper | \Box |
| Additives/Ingredients: | | Sorbitol | | | |
| Dana/Datata Flavor | | Whey | | | $\overline{\Box}$ |
| Bean/Potato Flour | | Flavoring | | (Other) | _ |
| NFDM | | Liquid Smoke | | • , | |
| Ca Red. DMS | | Citric Acid | | Sanitizing: | |
| Nitrates | | Citrate | | Dry | |
| Nitrites | | MSG | | Liquid | |
| Caseinates | | HPP | | Gas | $\bar{\Box}$ |
| Phosphates | | HVP | | | |
| Ascorbates | | GDL | | Denaturant | |
| Erythorbates | | BHA | | Lubricants | |
| Cure Mix | | BHT | | Dry Ice | |
| Spice Mix | | PG | | Charcoal | |
| Salt | | Frying Oil | | Sawdust | |
| Ice | | | | Anti-Foam | |
| Water | | (Other) | | Reagents | |



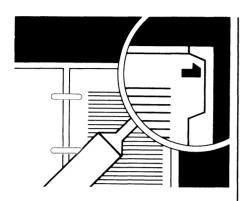
Step 4—Plant's Products



Develop a list of all the products processed in the plant. The list on the Step 4 tear sheet categorizes products into classes which need specific controls to meet the Federal meat and poultry inspection regulations.

| Cured: | Fresh/Frozen: | | Canned: | |
|----------------------|--------------------|--------|----------------------|--|
| Beef | Beef Cuts | | Luncheon | |
| Pork | Pork Cuts | | Chili | |
| | Boneless | | Stew | |
| (Other) | MSS/MDP | | Hash | |
| , | Chopped | | Pasta | |
| Smoked/Dried/Cooked: | Formed | | Ham | |
| Ham | Hamburger | | Picnic | |
| Bacon | Ground Beef | | Vienna | |
| Beef | Patties | | Deviled Ham | |
| | | | Potted | |
| (Other) | | | Tamales | |
| | | | Dried | |
| Sausage: | (Other) | | Pickled | |
| Fresh Beef | | | Corned | |
| Fresh Pork | Convenience: | | Soup | |
| Dry | Pizza | | | |
| Semi-Dry | Pies | | | |
| Franks | Dinners | | | |
| Bologna | Difficio | | | |
| Liver | | \Box | (Other) | |
| Vienna | | \Box | Other: | |
| Knock | | | Breaded | |
| | (Other) | | Battered | |
| | . , | | Enzyme | |
| | Fats/Oils: | | Beans w/Meat | |
| (Other) | Lard | | Chicken Frankfurters | |
| | Tallow | | Corn Dogs | |
| Sliced/Packaged: | Oleo | | Cheese Dogs | |
| Bacon | | | Roast Beef | |
| Ham | (Other) | | Sandwiches | |
| | | | Fried Chicken | |
| | Miscellaneous: | | Canned Boned Chicken | |
| | Cured Loaves | | Poultry Rolls | |
| | Nonspecific Loaves | | Basted Poultry | |
| | | | | |
| (Other) | (Other) | | | |
| | | | | |
| | | | (Other) | |

Step 5—Regulations



Using the list of raw materials from Step 3 and the list of the plant's processed products from Step 4, develop the list of meat and poultry regulations applicable to plant operations. Federal meat and poultry inspection personnel can assist in locating the applicable regulations. However, the regulations listed on the tear sheet will cover many of the basic meat and poultry operations. To complete the tear sheet, circle the applicable regulations and add any that are not listed.

| Receiving |] ection Require: | mante: | Doultor Inc. | nastian Bassisas | |
|-------------------------------|---------------------------|--------|--------------------|--------------------|---------|
| weat msp | ection Requirer | nems. | Poultry ins | pection Requirer | nents: |
| 318.1 | 318.2 | 318.3 | 381.49 | 381.59 | 381.65 |
| 320.1 | 320.2 | 320.3 | 381.145 | 381.147 | 381.175 |
| 320.4 | | | 381.176 | 381.177 | 381.178 |
| | | | 381.180 | 381.181 | |
| Manufact Meat Inspe | turing ection Requirer | nents: | Poultry Insi | pection Requirer | ments: |
| 318.4 | 318.5 | 318.6 | 381.65 | • | |
| 318.7 | 318.8 | 318.9 | 381.65 | | 381.145 |
| 318.10 | 318.11 | 318.12 | 381.147 | 381.148 | 381.149 |
| 318.15 | 318.16 | 318.16 | 381.150 | 381.152 | 381.180 |
| 318.17 | 318.18 | 319 | | | 3311133 |
| | g and Labelin | | | | |
| Meat Inspection Requirements: | | | Poultry Insp | pection Requiren | nents: |
| 312.1 | 312.2 | 316.9 | 381.96 | 381.115 | 381.116 |
| 316.10 | 316.11 | 316.13 | 381.117 | 381.118 | 381.119 |
| 316.14 | 316.15 | 316.16 | 381.120 | 381.121 | 381.122 |
| 317.1 | 317.3 | 317.4 | 381.123 | 381.124 | 381.125 |
| 317.6 | 317.7 | 317.8 | 381.126 | 381.127 | 381.128 |
| 317.13 | 317.14 | 317.16 | 381.129 | 381.130 | 381.131 |
| 317.17 | 317.19 | | 381.132 | 381.133 | 381.138 |
| | | | 381.139 | 381.141 | 381.143 |
| | | | 381.148 | 381.149 | 381.155 |
| | | | 381.156 | 381.157 | 381.158 |
| | | | 381.159 | 381.160 | 381.161 |
| | | | 381.162 381.165 | 381.163 | 381.164 |
| | | | 381.168 | 381.166 381.169 | 381.167 |
| | | | 381.171 | 361.169 | 381.170 |
| Shipping | | _ | _ | | |
| Meat Inspe | ction Requiren | nents: | Poultry Insp | ection Requirem | ents: |
| 308.3 | 308.9 | 308.10 | 381.59 | 381.115 | 381.175 |
| 308.11 | 308.12 | 316.6 | 381.176 | 381.177 | 381.178 |
| 316.9 | 316.13 | 316.14 | 381.179 | 381.180 | 381.190 |
| 320.1 | 320.2 | 320.3 | 381.191 | 381.192 | |
| 320.4 | 320.5 | 320.6 | | | |
| 325.1 325.15 | 325.3 | 325.14 | | | |
| Sanitation | 1 | | | | |
| | ction Requirem | ents: | Poultry Insp | ection Requirem | ents: |
| 308.3 | 308.4 | 308.6 | 381.45 | 381.46 | 381.47 |
| 308.7 | 308.9 | 308.10 | .381.48 | 381.49 | 381.50 |
| 308.11 | 308.12 | 308.13 | 381.53 | 381.54 | 381.55 |
| 308.14 | 308.15 | | 381.56 | 381.57 | 381.58 |
| | | | 381.59 | 381.60 | 381.61 |
| | | | 381.65 | | |

Step 6—Plant Hazards



Hazards can be present at many points in the plant. The earlier that product hazards are identified and controlled, the easier and less expensive it is to maintain control. One technique that has gained acceptance in hazard identification is the identification of critical control points. By reviewing the material previously listed in Step 4 and Step 5, it is possible to predetermine many of the critical control points present in your plant.

In guidelines published by foodrelated organizations, it is recommended that control points be *preventive*, *participative*, and *practical*. The control points should prevent

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mistakes, contribute to a total plant effort to reduce error, and be practical enough for the plant to achieve. Although numerous hazards exist, some of the common ones relate to human health, product compliance, and the environment.

Hazards can be visible or invisible. Detection of invisible hazards requires specialized techniques and testing devices. But even visible hazards are sometimes overlooked when key employees do not maintain or have not been trained to identify the necessary quality awareness characteristics. The following examples can help to increase awareness of critical control points.

Drevention

Health hazards:

Hazard

| Hazaro | Source | Prevention |
|----------------------|---|---|
| Metal fragments | Boneless meats; plant maintenance workers; thermometers; pumping injectors; poultry hock locks. | Magnets; incoming inspection; proper use of staples; routine on-line checks for broken injector needles; evaluation of poultry hock lock usage; awareness by plant maintenance workers. |
| Wood splinters | Boxed beef; boxed pork; combo-bins. | Incoming inspection of boxes stacked on wooden pallets; review of bulk product handling practices. |
| Plastic fragments | Incoming raw materials; teflon equipment parts. | Incoming inspection; review of sup- pliers' practices; awareness by plant maintenance workers of excessive equipment wear. |
| Paint flakes | Incoming raw materials; plant maintenance workers. | Incoming inspection; review of sup- pliers' practices; awareness by plant maintenance workers that paint is poison. |
| Food-borne illness | Processed products | Increase awareness of processing practices related to the commonly implicated products. |
| Glass fragments | Products packed in glass containers; incoming raw materials. | Incoming inspection; evaluation of product connected with filler malfunction; awareness of glass fragments inside the cases with broken glass containers. |
| Accidental poisoning | Sodium nitrite | Knowledge of use; orderly storage area; denaturing pure substance; inventory. |

Fitness for use hazards:

| Hazard | Source | Prevention |
|--|--|---|
| Bone chips | Sausage | On-line sampling by either visual detection methods or instrument detection. |
| Bacterial spoilage; off-flavor/odor; fat rancidity | Processed products | Control and verification of environ- mental conditions; inventory control (first in, first out). |
| Rust flakes | Water; ingredients; equipment. | Regular checks of screens and filtration devices for the plant's incoming water supply; water sampling and plant laboratory analysis through rapid filter paper for presence of sediment; increase awareness during interruption of the plant's water supply. |
| Metal filings | Excessive equipment wear; plant repairs. | Microscopic examination of suspect equipment which shows wear, such as augers, ham molds; maintenance workers; magnets. |
| Solder/weld droplets | Metal containers; plant repairs. | Incoming inspection of metal containers (made on premises or purchased); inspection of newly installed equipment; awareness of repairs to plant's food-contact equipment. |
| Microbiological/filth/insect contamination. | Ingredients and additives (starch, extenders, spices, liquid sweeteners, ice, soy products); condensation; employee practices. | Incoming inspection; supplier evaluation program; letter of guaranty; certificate of test/analysis; environmental controls; awareness of employee practices. |

Economic hazards:

| Hazard | Source | Prevention | |
|--------------------------|--------------------|--|--|
| Giveaway | Retail packages | "Up-front" control of processing such as stuffing, filling, mixing, layering. | |
| Poor quality | Raw materials | Evaluation of all suppliers' materials; develop specifications and suppliers manual. | |
| Poor customer acceptance | Processed products | Canvass and followup of customers' satisfaction. | |
| Too much chicken | Chicken broth | Use "fill-in" weight with control charts for 80% boned chicken. Top with broth (cheaper ingredient) to reach the net weight label declaration. | |

| Time hazards: | | |
|---|-------------------------------|---|
| Hazard | Source | Prevention |
| Loss of shelf-life; loss of freshness before expiration of pull date | Perishable processed products | Control of inventory (first in, first out); verification of packaging materials' integrity; program to educate the user; micro checks of foodcontact surfaces; evaluation of raw materials. |
| Fatting out | Cooked sausage | Prevent overchopping; control of ra materials' fat content prior to formulation. |
| Discoloration | Cured meats | Control of nitrites; rinse food-contact equipment to control hyprochlorite residues; reduce exposure to light. |
| Human hazards: | | |
| Hazard | Source | Prevention |
| Performance of a processing step out of sequence | Processed products | Provide product formulation recipes at processing site; verify correct batch make up; audit the daily batc make up sheets. |
| Failure to perform all of or part of a task | Processed products | Verify that key employees are ampl trained; reduce physical stress. |
| Ingesta on poultry | Poultry deboning operation | Monitor person(s) who pull the crop on the slaughter floor (wash hands between birds); monitor growers to determine that feed has been with- held prior to slaughter; inspect upo receipt. |
| Employee sabotage | Processed products | Examine all customer complaints to determine if sabotage is a possible cause of user dissatisfaction; ascertain potential for the act. |
| Environmental hazards: | | |
| Hazard | Source | Prevention |
| Loose texture; poor bite resistance | Ground beef patties | Control temperature at time of forming. |
| Condensate | Processed products | Use micro monitoring rather than midshift cleanup. |
| Freezer burn | Frozen products | Proper application of skintight, moisture-proof packaging materials |
| naccurate net weight | Retail packages | Provide level, vibration-free, clean weighing devices. |
| | | - gg |

| Hazard | Source | Prevention |
|---|---|---|
| Excess restricted ingredients | Nitrate, nitrite, phosphate, ascorbic acid, erythorbate, corn syrup, corn syrup solids, methyl polysilicone and malt syrup. | Control, correct usage and laboratory verification. |
| Fresh pork sausage: | | |
| Hazard | Source | Prevention |
| Excess moisture | Added water and ice | Verify and control maximum limitation of 3% moisture. |
| Cooked sausage: | | |
| Hazard | Source | Prevention |
| Excess binders | Non-fat dry milk solids, cereals, soy products. | Verify formulation to not exceed 3.5% extenders/binders, except, isolated soy protein to not exceed 2%. |
| Sliced packaged products: | | |
| Hazard | Source | Prevention |
| Fail label declaration of net weight | Unreliable weight control | Use control charts to plot on-line sampling results. |
| Fresh/frozen meats: | | |
| Hazard | Source | Prevention |
| Excess fat | Ground beef | Use rapid fat analyses for "up front" verification of raw materials and compliance with 30% fat limitation. |
| Convenience foods: | | |
| Hazard | Source | Prevention |
| Too little meat | Meat pies | Use control charts to plot on-line sampling results of plant's production history and determine whether noncompliance is due to low target weights, excess variability or other causes. |
| Fats/oils: | | |
| Hazard | Source | Prevention |
| Combination antioxidants and synergists | Lard | Verify use of additives. Maximum limitation of 0.01% BHA and citric acid alone or in combination. |

| Miscellaneous: | | | | |
|---|---------------------------------------|----------------------------|---|---|
| Hazard | Source | | Prevention | |
| Inventory of caseinates | Nonspecific loave | | | on product make sheet t inventory is to be kept. |
| Canned: | | | | |
| Hazard | Source | | Prevention | |
| Added substance | Cured ham | | Evaluate processing procedures to control the percent pump. | |
| Other products: | | | | |
| Hazard | Source | | Prevention | |
| Binding agents | Poultry rolls | | Change label 3% binders t | l if cooked rolls exceed o "binders added." |
| Poultry meat | Breaded poultry | | Provide control charts for on-line control of breading with maximum 30% limitation. | |
| Once the sensitivity to critical control points is achieved, it is possible to focus more sharply on the key factors in the quality system. The Federal Meat and Poultry Inspection Regulations require specific critical control points that are usually related to finished product testing. However, a broad-based quality system will include "up-front" control points. In the tear sheets, the control points which relate to the inspection | " " " " " " " " " " " " " | | (Not More Than) (Not Less Than) (Individually Quick Frozen) (Mechanically Separated Species) (Mechanically Deboned Poultry) (Added Substance) (Water) (Identification) (Analysis of Variance) (Meat and Poultry Inspection) | |
| Plant Hazards | | Methods of | analyses: | |
| Check control points related to plant's opera | ation: | Rapid | | |
| Book and the | | | | |
| Raw materials: Meat/Poultry: | | | • | |
| Identification (Est No., tag, label, etc | :) (: | | | |
| Beef/mutton inventory | | | | |
| Foreign source | _ | | | |
| Wholesomeness | | | | |
| Temperature: | | - | | |
| Thermocouples | | (Other) | | |
| Evaluation (Color, texture, appe | | | | |
| etc.) | | | | |
| Receiving inspection: | | | | |
| Sample size | | | | |
| Frequency | | | • | |
| Action | | Casings: Natural | | |

| Sampling plan (Boneless meats): | | Disposition of rejected materials | Г |
|--|-------------------|-------------------------------------|---|
| Sample size | | Notification of MPI | |
| Frequency | | Supplier's manual | _ |
| Action | | Casings: | |
| Cured: | | Artificial/collagen | Г |
| Percent nitrite | | ,au on agon | - |
| Phosphates | | | |
| | | | |
| onmeat: | | Nonfood, food-contact: Containers: | |
| Additives: | | Metal: | |
| Designated area | | | _ |
| Examined prior to use | | Condition | |
| Intended use | | Source (premises/non-plant) | |
| Labeled: | | Plain, beaded, lithographed | |
| Name of product | | Enamel, resin or polymer | - |
| Ingredients statement | | Extruded | |
| Name/address of manufacturer | | 2 piece | |
| Percent restricted ingredients, if any | | 3 piece | |
| | | Glass: | |
| Tracer, if any | | Condition | |
| | | Baby food | |
| Food Chemical Codex | | Annular space | |
| FDA | | Plastic: | |
| USDA supervised | | Condition | |
| Letter of guaranty: | | Sharp projections | |
| Limited | | Pouch: | _ |
| Continuing | | Specifications | |
| Potability: | | Cook-in film: | |
| Water | | Integrity | |
| Purchased ice | | | |
| Examination: | | (Other) | |
| Sight | | , , | |
| Feel | $\overline{\Box}$ | Packaging: | _ |
| Smell | ī | Intended use and performance | Ĺ |
| Raw vegetables | | Transfer color/odor to product | |
| Sampling plan: | | Paper | - |
| Sample size | | Polyester | |
| | | Cellophane | |
| Frequency | | Thermoplastic: | |
| Action | | Polyethylene | |
| Methods of analyses: | | Polypropylene | |
| Micro | | Nylon | |
| Residue | | PVC | |
| Filth | | Saran | |
| | | Surlyn | |
| (011 -) | | Vinyl | |
| (Other) | | Copolymers | |
| Restricted ingredients: | | Pliofilm | |
| Security | | Aluminum foil: | |
| Inventory: | | Salty/acidic products | |
| Caseinates/soy products | | Laminates | |
| Supplier rating procedure | | Stockinet: | - |
| Tagging rejected additives/ingredients | | | |
| Receiving log | | Legibility/label | |
| Approval for use tags: | | | |
| Passive (nonconforming supplies | | | |
| tagged) | | (Othor) | |
| Active (conforming supplies tagged) | | (Other) | |

| Specifications: | | Charcoal: | |
|------------------------------------|-------------------|---|-------------------|
| Coatings | | Intended use | |
| Water vapor permeability | | Purity/particle size | |
| Gas permeability | | Sawdust: | |
| Heat sealability | | Intended use: | |
| Physical stability | | | |
| | | Prohibited: Boning, grinding, cutting | |
| Flexibility/formability | | room floors | |
| Inertness | | Smokehouse: Nonresinous | |
| Transparency/opacity | | Antifoaming agents: | |
| Odor/taste | | Identification | |
| Machinability | | Intended use: | |
| Grease resistance | | Rendered fats/soups | |
| Light absorption | | Receiving log | _ |
| Tape release | | Rejected non-food raw materials: | |
| | | Passive (nonconforming supplies | |
| (Other) | | | |
| , , | | tagged) | |
| | | Active (conforming supplies tagged) | |
| Sanitizing: | | Disposition | |
| Identification: | | Notification of MPI | |
| "List of Chemical Compounds" | | Supplier's manual | *** |
| Name | | | |
| Manufacturer | | | |
| | | Holding raw materials: | |
| Concentration | | Inventory control (first in, first out) | |
| Mixing instructions | | Environmental controls: | |
| Instructions for use | | Recording thermometers | |
| Tagging unacceptable compounds | | Anemometer | |
| HAZARD: Ammonia/chlorine | | Relative humidity: | |
| ······ | | Wet bulb/dry bulb | |
| | | | |
| (Other) | | (Other) | |
| | | • | |
| _ | | Identification | |
| Denaturants: | | | |
| Identification: | | Processing department: | |
| "List of Chemical Compounds" | | Cooked sausage: | |
| Appropriate for use: | | _ | |
| Rendered fat | | Product preparation: | |
| Poultry product | | Identification | |
| Animal food | $\overline{\Box}$ | Meat/poultry wholesomeness | |
| Inedible products | $\overline{\Box}$ | Reinspection | |
| modible products | ليا | Proximate analysis | |
| | | Temperature | |
| Lubricants: | | Magnet | |
| Identification | | Formulation: | |
| Approval letter | | Meat block: | |
| Method of application | | Without byproducts: | |
| Durability | | Beef | |
| | - | | |
| Mean Time Between Application | | Pork | |
| | | (Othor) | |
| Dry ice: | | (Other) | |
| | | Raw/cooked poultry meat | |
| Intended use | | (NMT 15%) | |
| Safety: | | Uncooked, cured primal pork | |
| Ventilation for snow hoods | | Bacon, (NMT 10%) | |
| Warning | | MSS | $\overline{\Box}$ |
| Monitoring processing room: | | | |
| Maximum 5,000 ppm/5 ft above floor | | | |
| level | | | |
| | | | |

| Rework: | | Flavoring agents: | |
|--|--|--------------------------------|---|
| Casings stripped, unstripped or | | Sugar: | |
| snipped | | Sucrose/dextrose | |
| Binding capacity | | Corn syrup | |
| Color characteristics | | Corn syrup solids \ -NMT 2.0% | |
| Texture characteristics | | Glucose syrup | |
| Least-cost formulation | | Sorbitol (NMT 2.0%) | |
| With byproducts: | | Malt syrup (NMT 2.5%) | |
| Meat (NLT 15%) | П | Monosodium glutamate | |
| Partially defatted pork/beef fatty | | Water/ice: | |
| tissue (NMT 15%) | | Measured amount | |
| , | | HAZARD: Calibration of scales/ | |
| Bacon (NMT 10%) | L.J | meters | |
| Uncooked, cured pork with | | Spices/flavorings: | |
| phosphates | | • | |
| Poultry products (NMT 15%) | | Seasoning mix: | |
| Rework: | | Percent protein | |
| Casings stripped, unstripped or | | Salt | |
| snipped | | Spice | |
| Binding capacity | | Mustard (NMT 1%) | |
| Color/texture characteristics | | Flavorings | |
| Least-cost formulation | | Sterilization/purity | |
| Additives: | | Spice potency | |
| Cure/cure mix: | | Analyses | |
| Nitrate (2.75 oz/100 lb) | | Total batch weight | |
| Nitrite (0.25 oz/100 lb) | | Projected finished weight | |
| Ascorbic acid (0.75 oz/100 lb) | | Premeasured | |
| Erythorbic acid (0.75 oz/100 lb) | | Meters | |
| Ascorbate (0.875 oz/100 lb) | | Scales | |
| Erythorbate (0.875 oz/100 lb) | | Calibration | |
| Glucona delta lactone | | Verification | |
| (8.0 oz/100 lb) | | Initials | |
| Sodium acid pyrophosphate | | Method of preparation: | |
| (8.0 oz/100 lb) | | Batch processing: | |
| | | Identification | П |
| Citric acid Ascorbic acid -NMT 50% - Erythorbic acid | | Grinding: | |
| | | | |
| Citrate | | Lean meat(Plate size) | |
| | | Fat meat | |
| | | (Plate size) | |
| (Other) | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | |
| , | | Mixing: Lean meat | |
| Extenders/binders: | | | |
| NFDM | | Fat meat | |
| Ca Reduced DMS | | Additives | |
| Cereal flour | | Chopping: | |
| Vegetable flour NMT 3.5% | | Cycles | |
| Soy flour | | Time | |
| Soy protein concentrate | | HAZARDS: Overchopping/ | |
| Whey | | dull blades | |
| | | Stuffing: | |
| | | Hydraulic | |
| (Other) | | Pneumatic | |
| Isolated soy protein | | HAZARD: Stuffing pressure | |
| \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | | Casings: | |
| (Other) | | Natural: | |
| Salt: | | Salted: | |
| Anti-caking agent | | Rinsed/flushed | |
| , 5 a g a g 5 | | | • |

| Preflushed: | Presalting: | |
|--------------------------------|------------------------------------|--|
| Rinsed | Time | |
| Artificial: | Temperature | |
| Approved | Percent salt | |
| Clear/opaque | Mixing/blending: | |
| • • | Lean meat | |
| Colored | Fat meat | |
| Treated | Additives | |
| Printed/plain | Time | |
| Prestruck | Temperature | |
| Collagen: | Emulsifying: | |
| Approved | Plate size | |
| Linking: | pH | |
| Automatic | Time | |
| | Temperature | |
| (Other) | HAZARD: Overextending binding | |
| HAZARD: "Up front" weight | لسما | |
| control, each link | capacity | |
| Holding: | Vacuumizing: | |
| Location | Removal of air | |
| Time | Control | |
| Temperature | Verification | |
| Cooking/smoking cycle: | Stuffing: | |
| Color development | Casings: | |
| Time | Approved | |
| Temperature | Color | |
| Cycles | Treated | |
| Internal temperature: | Printed/plain | |
| Pork ingredient (NLT 137°) | Stuffing pressure | |
| Smoke generation: | Casing diameter | |
| Sawdust | HAZARD: Understuffing/ | |
| Liquid smoke | loose ends of stuffed | |
| Casing surface, wet/moist | Strands | |
| Steam production | Linking: | |
| Cold-water shower | Automatic | |
| Smokehouse shrink: | Controls | |
| | HAZARD: "Up front" weight control, | |
| Target | each link | |
| Control | Cooking/smoking cycle: | |
| Holding: | Preheated temperature | |
| Temperature | Time | |
| Time | Temperature | |
| Humidity | Cycles | |
| HAZARD: Low humidity/ | Internal temperature: | |
| crusting | Pork ingredient (NLT 137°) | |
| Peeling: | Smoke generation: | |
| Hand | Sawdust | |
| Automatic | Liquid smoke | |
| Continuous processing systems: | Cold-water shower | |
| Identification | Smokehouse shrink: | |
| Grinding: | Target | |
| Lean meat | Control | |
| (Plate size) | Brine chilling: | |
| HAZARD: Time/temperature | Time | |
| Fat meat ······· | Temperature | |
| (Plate size) | Brine strength | |
| HAZARD: Time/temperature | Internal temperature | |
| | internal temperature | |

| Peeling: | | Microanalyses: | |
|----------------------------------|---|----------------------------------|---|
| Automatic | | Sampling plan | |
| | | Laboratory | |
| (Other) | | Interpretation of results | |
| Cooler storage: | | Use of data | |
| Time | | Projected shelf-life | |
| Temperature | | Sanitation verification | |
| • | | | |
| Humidity | | (Other) | |
| Cooler shrink: | | (Other) | |
| Target | | | |
| Control | | | |
| Sampling prior to packaging: | | Loaves and luncheon meat: | |
| Percent added water | _ | Product preparation: | |
| (NMT 10%) | | Identification | |
| Percent fat (NMT 30%) | | Meat and poultry ingredients | |
| Sampling plan: | | Proximate analysis: | _ |
| Frequency | | Sample size | |
| Limits | | Frequency | |
| Action zones | | | |
| Packaging: | | Methods of analyses | |
| Vacuum packaging | | Reinspection of ingredients | |
| | | Temperature | |
| (Other) | | Magnet | |
| , , | | | |
| Impermeable film Verification: | | (01) | |
| | | (Other) | |
| Correct closure | | Formulation: | |
| Exclusion of air | | Specific loaves: | |
| Applicable label: | | Meat block: | |
| 70/30 | | Excludes byproducts | |
| Byproducts | | MSS | |
| Binders/extenders | | Phosphated trimmings | |
| Predominance | | Rework | |
| Special handling | | Binding capacity | _ |
| Net quantity of contents | | Least-cost formulation | |
| Label product comparison | | | |
| Net weight: | | | |
| Scale: | | (Other) | |
| Calibration | | Nonspecific loaves: | |
| Stickers | | Meat block: | |
| Tare weight | | Byproducts | |
| Subgroup size | | MSS/MDP | |
| Sampling frequency | | Rework | |
| Limits: | _ | Binding capacity | |
| Process capability | | Least-cost formulation | |
| Warning | | | |
| Individual limits (each package) | | | |
| , | | (Other) | |
| Subgroup limits (5/10 packages) | | , , , | |
| Subgroup range (difference | | Additives: | |
| between high/low) | | Cure/cure mix: | |
| Runs | | Nitrate (2.75 oz/100 lb) | |
| Shift average | | Nitrite (0.25 oz/100 lb) | |
| Standard deviation | | Ascorbic acid (0.75 oz/100 lb) | |
| ANOVA | | Erythorbic acid (0.75 oz/100 lb) | |
| Charts | | Ascorbate (0.875 oz/100 lb) | |
| | | Erythorbate (0.875 oz/100 lb) | |
| | | Citric acid) (Ascorbic acid | |
| | | Citrate Assorbate | |
| | | (Maccordate | |

| Glucona delta lactone (8.0 oz/100 lb) Sodium acid pyrophosphate (8.0 oz/ | | Mixing Chopping | |
|---|------|----------------------------------|---|
| 100 lb) | | Forming: | |
| Caseinate: nonspecific loaves: | | Molds | |
| inventory daily | | Vacuum package | |
| | | Cooking: | |
| | | Time | |
| (Other) | | Temperature | - |
| Extenders/binders: | | Internal temperature: | |
| NFDM | | Pork ingredient (NLT 137°) | |
| Whey | -967 | Cooling: | |
| Ca Reduced DMS | | Time | |
| Cereal flour | | Temperature | |
| Vegetable flour | | Holding: | |
| Soy flour | | Time | |
| Soy protein concentrate | | Temperature | |
| Isolated soy protein | | Humidity | |
| Inventory: more than 1 soy product | | Sampling: | |
| Luncheon loaf: | | Sampling plan | |
| NFDM, cereal prohibited | | Frequency | - |
| Meat in name: binders/extenders | | Limits | |
| (NMT 3.5%) | | Packaging: | |
| Salt: | | Vacuum packaging | |
| Anti-caking agent | | | |
| Flavoring agents: | | (Other) | |
| Sugar | | Impermeable film | |
| Corn syrup/corn syrup solids/glucose syrup: | | Verification: | |
| Nonspecific | | Correct closure | |
| Luncheon (NMT 2.0%) | | Exclusion of air | |
| Monosodium glutamate | | Applicable label: | |
| Water/ice: | | Extenders/binders | |
| Nonspecific: measured amounts | | Predominance | |
| Specific loaves (NMT 3.0%) | | Special handling | |
| Ingredients: | | Quantity of contents | |
| Olives | | Label/product comparison | |
| Peppers | | Product visible/invisible | |
| Pickles | | Dipped in hot oil | |
| Onions | | Meat in name | |
| Spices: | | Net weight: | |
| Seasoning mix | | Scale: | |
| Sterilization/purity | | Calibration | |
| Spice potency | | Stickers | |
| Analyses | | Tare weight | |
| Premeasured batch | | Subgroup size | |
| Total batch weight | - | Sampling frequency | |
| Projected finished weight | | Limits: | |
| Meters | | Process capability | |
| Scales | | Warning | |
| Calibration | | Individual limits (each package) | |
| Verification: | | Subgroup limits (all packages) | |
| Initials | | Subgroup range (difference | |
| Method of preparation: | | between high/low) | |
| Identification | | Runs | |
| Grinding: | - | Shift average | |
| Lean meat | | Standard deviation | |
| (Plate size) | | ANOVA | |
| Fat meat | | Charts | |
| (Plate size) | | J | |

| microanalyses: | | Chilled pork sausage operations: | |
|--------------------------------------|---|--------------------------------------|--------------|
| Sampling plan | - | Pork trimmings: | |
| Laboratory | | Specifications: | |
| Interpretation of results | | Lean/fat ratio | |
| Use of data | | pH | |
| Projected shelf-life | | Rancidity | |
| Sanitation verification | | | |
| | | (Other) | |
| (Other) | | • | |
| (Other) | | Seasoning: Salt, sugar, pepper, sage | |
| | | Antioxidants (0.01/0.02%) | |
| | | Synergists (0.01%) | |
| Fresh pork sausage: | | Mixing/blending: | |
| Pre-rigor (hot boning) operations: | | Fat control | |
| Boning: | | HAZARD: Overmixing | |
| On-the-rail | | المسا Grinding: | |
| Table | | Plate | |
| | | (size) | |
| (Other) | | HAZARD: Temperature | |
| Reinspection (boneless meats): | | Particle size | |
| | | | |
| Sampling plan | | Bloom | |
| Sampling size | | Dull knives | |
| Frequency | | Worn plates | |
| Acceptance criteria | | Blade clearance | |
| Fat (NMT 50%): | | CO ₂ snow delivery | |
| Control procedure for fat | | Mixing: | |
| Use of MSS | | Ice (NMT 3%) | |
| Coarse chopping: | | Grinding: | |
| HAZARD: Bone chips (Visual or | | Plate | |
| detection device) | | (size) | |
| Mixing: | | CO ₂ snow delivery | |
| - | | HAZARD: Temperature | |
| Ice (NMT 3%) | | 1 7 | |
| Seasoning: Salt, sugar, pepper, sage | | Particle size | |
| Antioxidants (0.01/0.02%) | | Bloom | |
| Synergists (0.01%) | | Dull knives | |
| Grinding: | | Worn plates | |
| Plate | | Blade clearance | |
| (size) | | Chub packaging: | |
| CO ₂ snow delivery | - | Size | |
| HAZARD: Temperature | | HAZARD: Smearing | |
| Particle size | | Stuffing pressure | |
| Bloom | | Packaging material: | |
| Dull knives | | Applicable label | |
| Worn plates | | Net weight: | |
| Mixing/blending: | | Scale: | |
| Fat control | | Calibration | |
| | | Stickers | |
| HAZARD: Overmixing | | | |
| Grinding: | | Tare weight | |
| Plate | | Subgroup size | |
| (size) | | Sampling frequency | |
| CO ₂ snow delivery | | Limits: | |
| HAZARD: Temperature | | Process capability | |
| Particle size | | Warning | |
| Bloom | | Individual limits (each package) | |
| Smearing | | Subgroup limits (all packages) | $\bar{\Box}$ |
| Sincularly | | Subgroup range (difference between | |
| | | | |
| | | high/low) | ш |

| Runs | ☐ Pickle formulation: |
|---|--|
| Shift average | Pickle formula make sheet |
| Standard deviation | Cure mixtures |
| ANOVA | Additives control (10% pump) (10 lb/gallon): |
| Charts | □ Nitrate (7 lb/100 gallon) |
| Microanalyses: | Nitrite (2 lb/100 gallon) |
| Sampling plan | Phosphate (50 lb/100 gallon) |
| Laboratory | Ascorbic acid (75 oz/100 gallon) |
| Interpretation of results | Erythorbate (87.5 oz/100 gallon) |
| Use of data | Corn syrup (60 lb/100 gallon) |
| Projected shelf-life | Corn syrup solids (50 lb/100 gallon) |
| Sanitation verification | ······ |
| (Other) | (Other) |
| Blast chilling: | HAZARD: Lack of agitation |
| Time | Sampling: |
| Temperature | Salometer |
| Method | |
| Recording devices | |
| Packing: | (Other) |
| Procedure | • |
| Inventory instructions | Identification of pickle lines: |
| • | Color coding |
| (Other) | (Other) |
| | Phosphates: |
| Cured and smoked meats (pickle injection cure): | Pork, Yes |
| Product preparation: | Beef, No |
| Identification | Processing procedure: |
| Reinspection: | Processing chart: |
| Wholesomeness | Products: |
| Proximate analysis | Regular |
| pH | Water added |
| Fat analyses: | Imitation |
| lodine number | Style/class |
| TBA | Weight range |
| AOM | Lot size/weight |
| | Product pumping: |
| (Other) | Target percent pump |
| Temperature | |
| Defrosting/tempering: | Pumping time |
| First in, first out (FIFO) | Tames and the of states and its |
| Frozen: | HAZARD: Purge/overpump |
| Brine defrost | Control tests: |
| Complete defrost | Frequency |
| Controls: | |
| Time | |
| | Method |
| Temperature: | On-line verification |
| Meat | |
| Poultry | Frequency |
| Relative humidity: | Non-operator checks |
| Wet bulb/dry bulb | Filtration: |
| Anemometer | Control of sediment |
| Recording devices | Verification of screens/filters |
| | Frequency |
| | Operator/non-operator checks |
| | Tumbling/massaging |

| | Cover: | Beef: | |
|----------|-------------------------------|---|--|
| | No cover used | Percent gain: | |
| | Wet: | Brisket (NMT 20%) | |
| | wet. Pickle: | Other beef (NMT 10%) | |
| | | Smoke/steam combo: | |
| | Temperature | Modern smokehouse, Yes | |
| | Salometer | Up-draft, multi-story, No | |
| | (O4b or) | Smokehouse shrink: | |
| | (Other) | Target | |
| | Dry: | Control: | |
| | Salt/mixtures | Charts | |
| | | 2.1.2 | |
| | (Other) | Verification | |
| | Time | Frequency | |
| | Temperature | HAZARD: Missed target | |
| 3 | HAZARD: Souring/off-flavor | Cooler: | |
| <i>ل</i> | Target gain/loss | Precooled temperature | |
| | Controls: | Time | |
| | Time | Thermostats | |
| | Temperature | Humidistats | |
| | Recording devices | Shrink: | |
| | Verification target gain/loss | Target | |
| | Smoking and cooking: | Recording devices | |
| | Cycles: | HAZARD: Missed target | |
| | Programmed | Sampling for laboratory analysis: | |
| | Manual | Frequency | |
| | Preheated temperature | Sampling point | |
| | Smoke: | Sample preparation: | |
| | Sawdust: | Boning | |
| | Dry | Skinning | |
| | Dampened | Grinding | |
| | Dampened | Identity of laboratory | |
| | (Other) | Interpretation of results: | |
| | Electrostatic | Product action zones | |
| | | Labeling: | |
| | Liquid: | Approved | |
| | Dipped | Water added: | |
| | Sprayed | Kemex strip | |
| | (Other) | (Comox data) | |
| | • | (Other) | |
| | Cooking: | Inspection mark | |
| | Relative humidity | Special handling | |
| | Time | Label/product comparison | |
| | Temperature | Quantity of contents (catch weight) | |
| ~- | Cycles | HAZARD: Environmental factors | |
| لمحسيا | HAZARD: Crusting | | |
| | Regulatory requirements: | Net weight: | |
| | Internal temperature: | Scale: Calibration | |
| | Fully cooked (NLT 148°) | | |
| | Regular smoked (NLT 137°) | Stickers | |
| | Tender (NLT 140°) | Sampling frequency | |
| | Poultry (NLT 155°) | Tare weight | |
| | Baked (NLT 170°) | Total actual weight | |
| | Ham: | Total label weight | |
| | Percent green weight: | Difference | |
| | Regular (NMT 100%) | 0 | |
| | Water added (NMT 110%) | Shift average: | |
| | (Over 110%) | | |
| | | Control/action | |

| Charts | | Employees: | |
|-------------------------------|--|------------------------------------|--|
| Employee initials | | Gloves | |
| HAZARD: Missed tolerance | | Clothing | |
| | | (Other) | |
| | | Chopping: | |
| rozen ground beef patties: | | Rapid analysis: | |
| Boneless meat suppliers: | | Fat | |
| Fresh | | rat | |
| Frozen | | (Other) | |
| (Other) | | (Other) | |
| Receiving dock: | | (Other) | |
| Wholesomeness | | HAZARD: Consistency (temperature) | |
| Identification | | Grinding: | |
| Combo bins: | | CO ₂ delivery | |
| Temperature | | | |
| Weighed | | (Other) | |
| Relabeled: | | HAZARD: Consistency (temperature) | |
| Weight | | Blending: | |
| Supplier | No. of the last of | CO ₂ delivery | |
| Date | | Verification: | |
| | | Temperature | |
| Sampled: | | Fat | |
| Micro | | | |
| Fat | | (Other) | |
| pH | | , | |
| (Other) | | (Other) | |
| | | HAZARD: Blend/time (tough/rubbery) | |
| (Other) | | Metal detectors: | |
| Regulatory requirements: | | Verification: | |
| Beef: | | Frequency | |
| Frozen | | Method | |
| Fresh | | | |
| Cheek meat (NMT 25%) | | (Other) | |
| • | | Patty formers: | |
| Seasoning: | | Specifications: | |
| MSG | | Thickness | |
| Salt | | Diameter | |
| (Othor) | | Weight | |
| (Other) | | Verification: | |
| Fat: | | Frequency | |
| None may be added | | Method | |
| Analytical (NMT 30%) | | | |
| Water: | | (Other) | |
| None may be added | | | |
| Binders: | | (Other) | |
| None may be added | Ш | IQF patty freezing: | |
| Processing conditions: | | Tunnel: | |
| Temperature controlled rooms: | | • = | |
| Manual | | Temperature | |
| Computer | | Product travel time | |
| Micro checks of equipment: | | Metal detectors: | |
| Swabs | | Verification: | |
| | | Frequency | |
| (Other) | | Method | |
| | | (Other) | |
| | | , | |

| Patty stackers: | Laboratory analyses: |
|-----------------------------------|---------------------------|
| Interleaves | AOAC: |
| | Moisture |
| (Other) | Protein |
| Regular freezing: | Fat |
| Interleaves | |
| Patty stackers | (Other) |
| (Other) | (Other) |
| Boxing station: | Shipping: |
| Weight target | Inventory: |
| Labeled: | Manual |
| Product | Computer assisted |
| Weight | Verification of carrier: |
| | Odor |
| (Other) | Condition |
| Coded: | Refrigeration unit |
| Plant of origin | Precooled temperature |
| Date | Shipping instructions |
| Hour of production | |
| Product | (Other) |
| | F da |
| (Other) | Foodservice: |
| Weight verification: | Suppliers: |
| Random | Specifications: |
| No. of boxes | Meat/poultry ingredients: |
| Specifications | Fresh |
| Openitations | Frozen |
| (Other) | Chilled |
| Overwrap: | Dry |
| Shrinkwrap | Plant of origin |
| | Controls |
| (Other) | |
| Metal detector: | |
| Verification: | (Other) |
| Frequency | Nonmeat ingredients: |
| Method | Fresh: |
| Wethod | Grade |
| (Other) | Varietal type |
| (=) | |
| (Other) | (Other) |
| Freezer (non-IQF): | Processed: |
| Time | Grade |
| | Concentration |
| Temperature | Style |
| Product discharge: | Type |
| Insulated | |
| Verification product temperature: | (Other) |
| Frequency | Dairy: |
| Method | Grade |
| | Type/style |
| (Other) | Bakery: |
| | • |
| | Type/style |
| | Dimension |
| | (Other) |
| | (=) |
| | (Other) |

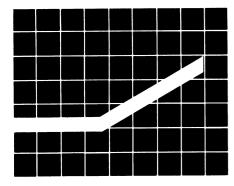
| Receiving dock: | | Portion control: | |
|------------------------------|---|-----------------------------|------|
| Wholesomeness | | Volume | |
| Identification | | Weight | |
| Temperature | | Dimension: | ** |
| Weight | | Length | |
| | | Width | **** |
| (Other) | | Thickness | - |
| Relabeled: | | | |
| Date of entry | | On-line sampling: | |
| | | Frequency | |
| Supplier | | Sample size | |
| Weight | | Verification: | |
| Code: | | Total weight | |
| Traceability | | - , , , | |
| (045) | | | |
| (Other) | | Metal detector: | |
| Sampled: | | Verification: | |
| Micro | | Frequency | |
| Sensory: | | Method | |
| Odor | | Wrapping: | |
| Texture | | Shrinkwrap | |
| Color: | | | |
| Electronic | | (Other) | |
| Visual | | Labeling: | |
| Frequency of sample | | Approved | |
| Sample size | | | L |
| Tolerances | | (Other) | |
| Supplier reliability index | | , | |
| | | Coding: | |
| (Other) | | Plant of origin | |
| , | | Date | |
| Processing conditions: | | | |
| Temperature controlled room: | | Traceability of ingredients | |
| Manual | | (01) | |
| Computer | - | (Other) | |
| Micro checks of equipment: | | Sampling: | |
| Swabs | | Frequency | |
| /O4b/ | | Sample size | |
| (Other) | | Verification: | |
| Employees: | | Wrapper integrity | |
| Gloves | | Product/label comparison | |
| Clothing | | | |
| | | (Other) | |
| (Other) | | Boxing station: | |
| Bulk storage tanks: | | Primary package integrity | |
| Temperature | | Label: | |
| pH | | Product | |
| Sensory | | Piece count | |
| Micro | | Weight | |
| Fabrication: | | Code | |
| Sandwiches: | | Cooler/freezer: | |
| Open face | | Tomporotura | |
| Specifications: | | Relative humidity | |
| Bread | | December of subsections | |
| Spread | | necolality devices | |
| | | | |
| Meat/poultry ingredient(s) | Ш | | |
| Dairy ingredient(s) | | | |
| Vegetable ingredient(s) | | | |
| Condiment(s) | | | |

| Laboratory analyses: | Coding: | |
|---|--------------------------------------|-----|
| AOAC: | Plant of origin | |
| Moisture | Date | |
| Fat | Hour of production | |
| Micro | Traceability of ingredients | |
| Yeast/mold | | |
| | (Other) | |
| (Other) | Sampling: | |
| Pizza: | Frequency | |
| Meat ingredient | Sample size | |
| Specifications: | Verification: | |
| · | Wrapper integrity | |
| Bread/dough | Product/label comparison | |
| Sauce: | · | |
| Viscosity | (Other) | |
| Total solids (specific gravity) | , | |
| Meat ingredient(s) | Boxing station: | |
| Vegetable ingredient(s) | Primary package integrity | |
| Cheese | Label: | |
| | Product | |
| (Other) | Piece count | |
| Portion control: | Weight | |
| Volume | Code | |
| Weight | Overwrap | |
| Dimension: | Blast freezer: | |
| Diameter | Time | |
| Thickness | Temperature | |
| Regulatory requirements: | Wind turbulence | |
| Pizza: | Recording devices | |
| With meat (NLT 15% fresh meat) | Freezer storage: | |
| With sausage: | Temperature | |
| Cooked sausage (NLT 12%) | Recording devices | |
| Dry sausage (NLT 10%) | Laboratory analyses: | |
| Pizza sauce: | AOAC | |
| With sausage (NLT 6%) | Micro | |
| On-line sampling: | Sensory | |
| | | |
| Frequency | (Other) | |
| Verification: | Shipping: | |
| Total weight | Inventory: | |
| Meat ingredient(s) | Manual | |
| • | Computer assisted | |
| Sensory | Verification of carrier: | |
| (Other) | Odor | |
| Metal detector: | Condition | |
| Verification: | Refrigeration unit | |
| | Precooled temperature | |
| Frequency | Shipping instructions | |
| Method | | |
| Wrapping: | (Other) | |
| Shrinkwrap | (Othor) | |
| (Other) | | |
| Labeling: | Canned meat/poultry operations: | |
| Approved | Products canned at facility include: | |
| | Emulsions | |
| (Other) | Cooked | |
| (33.) | Cooked and smoked | |
| | Cooked and smoked | |
| | Cuitu | 1 1 |

| Solid or semi-solid | | Physical: | |
|---|--------------|---------------------------------|--|
| Dried | | Equipment | |
| | | Frequency | |
| (Other) | | (Other) | |
| Containers used at facility include: | | Records kept | |
| Metal: | | Corrective action | |
| Two piece | | | |
| Three piece | | Processing control: | |
| (01) | | Process schedule: | |
| (Other) | | Product(s) | |
| Glass | | Style(s) | |
| Plastic | | Containers: | |
| Pouch | | Type | |
| Cook-in film | | Size | |
| | | Sterilizing value | |
| (Other) | | Process documentation: | |
| Ingredients: | | Process schedule: | |
| Meat/poultry: | | Recognized authority | |
| Wholesomeness | | Date of schedule | |
| Preconditioning | | Process adequacy: | |
| | | Critical factors | |
| (Other) | | Location | |
| Nonmeat: | | Plan of control | |
| Gravies | | Equipment: | |
| Sauces | | Retort: | |
| Brines | | Still | |
| Broths | | Continuous | |
| | | Hydrostatic | |
| (Other) | | | |
| Special processing: | | (Other) | |
| Precooking | | Hot water tank | |
| Braising | | Aseptic | |
| Deboning | | | |
| Slicing | | (Other) | |
| Forming | $\bar{\Box}$ | Description: | |
| | | Size | |
| (Other) | | Capacity | |
| Container control: | | Venting system | |
| Incoming empty containers, closures, mate | ariale: | Bleeders/mufflers | |
| Source | | Temperature and pressure | |
| Empty container handling system | | instruments | |
| Control procedures: | | Container loading/unloading | |
| Visual | | Container sterilization | |
| | | Odinamor stormzation | |
| Physical: | | (Other) | |
| Seam teardown | | Operating procedure | |
| Burst test | | Instrument checks for accuracy: | |
| (Other) | | Method | |
| , , | | | |
| (Othor) | | Frequency | |
| (Other) | | (Other) | |
| Storage | | ` , | |
| Cleaning | | Other controls: | |
| Records kept | | Traffic control | |
| Filled and sealed containers: | | Process schedule available at | |
| Control procedures: | | point-of-use | |
| Visual: | | Timing devices | |
| Frequency | | | |

| Initial product temperature | | Container handling: | |
|-----------------------------------|----------------------------|--------------------------------|--|
| Undue delay control | | Procedure | |
| Records kept | | Equipment sanitation | |
| Process deviations: | | Incubation: | |
| In-process handling: | | Sampling | |
| Alternate/reprocess schedule | | Facilities | |
| Hold procedure | | Incubator checks | |
| Person responsible | | Temperature | |
| Corrective action | | Thermometer checks | |
| Records kept | | Records | |
| Post-process handling: | | Abnormal containers | |
| Hold procedure | | Finished product: | |
| Evaluation report: | | Inspection: | |
| Visual examination | | Condition of container | |
| Special incubation procedure | | AQL procedure | |
| Action to be taken | | Product safety/stability | |
| Sterility level: | | Abnormal containers: | |
| USDA notified | | Procedure to determine cause | |
| Reprocessing/destruction | П | Significance of cause/incident | |
| Equipment: | | Product disposition: | |
| Calculations | | 100% inspection | |
| Computers | | | |
| Simulations | | Reprocessing | |
| Product control: | | Rework | |
| All deviations reported | П | Product recall: | |
| Notification to: | | Container codes: | |
| Name | | | |
| Title | | Meaning of numbers/symbols | |
| Hold tags | | Written procedure | |
| Information to process authority | | | |
| Maintenance of deviation file/log | | Condition of agricument | |
| Responsibility to release | | Condition of equipment/ | |
| Records: | | maintenance | |
| Forms: | | Container abuse | |
| Hold report | | Potential for recontamination | |
| Disposition | | Container closing: | |
| In-house process authority | | Condition | |
| Release | | Maintenance | |
| Post-processing: | | Overhaul | |
| Cooling: | | Processing systems: | |
| Procedure | | Functional equipment: | |
| Water source/chlorination | | Steam/water/air/drain lines | |
| Water reuse-recycling, if any | | Steam spreaders | |
| Chlorination checks: | | Valves, leaks | |
| Method | | Instruments, mufflers | |
| Place | | Alterations: | |
| | | Vent lines, headers, manifolds | |
| Frequency Water quality: | | Crates, baskets | |
| · - | | Heat medium: | |
| Microbiological | Miles Balance and a second | Steam | |
| Physical | | Hot water | |
| Chemical | | Flame | |

Step 7—Charts and Graphs



Adequate records are essential to the system's ability to provide the necessary controls. The degree of recordkeeping and the complexity of the records depends, in part, on the scope of the processing operation and the kind of products produced in the plant. Charts and graphs that are currently being used by the plant, along with instructions for their use, may be all that is necessary to document the system.

Figure 3: Sample Receiving Log

| Receiving Log for Boneless Meats, | | | | | | Packing Co. |
|-----------------------------------|--------------------|--------|----------|--------------------------|----------------|-----------------------|
| Date | Product | Weight | Supplier | Inspection/ Condition | Identification | Disposition |
| 9/30/80 | Reg. Beef Trim. | 9,000 | Est. 38 | Accept/Good | Lot 49 | Accept |
| 9/30/80 | Lean Beef Trim. | 500 | Est. 38 | Reject/Spoiled | Lot 50 | Return to Supplier |
| | | | | | | |
| | | | | | | |
| | 11 | | 1 | 1 | | 1 |

Figure 4: Product Temperature Record

| Date | Product Name | Min. Int. Temp. | Date | Product Name | Min. Int. Temp. |
|------|-----------------|--------------------|------|-----------------|--------------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | 7,7 | | |
| | | | | | |

One of the key advantages of charts and graphs is that they increase controls over raw materials used in the plant. For example, if undetected hazards in the raw materials adulterate the finished product, good records enable the identification of the lots, codes, or production shifts that might be considered suspect. This activity provides a strong defense against product liability claims. The section devoted to quality control strategy, page 3, highlights some of the concerns related to product liability law.

Plants may wish to require employee initials or signatures on their records. Identifying a person's role in the production of finished product can motivate that person to exercise more care in making decisions. The frequency with which supervisors review plant-generated records also is important, because it demonstrates to employees the extent of management concern about the accuracy of such information.

The following examples illustrate some of the charts and graphs that might be used as plant records. These can be modified to fit a plant's processing conditions. Only charts and graphs that can be maintained by the employees should be designed for the system.

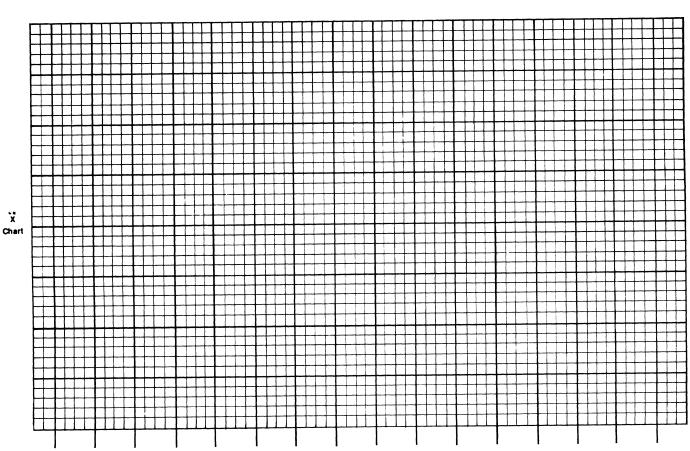
Incomplete or missing entries on plant records are considered deviations from the quality system. The severity of these infractions can be judged by the relationship of the record to a hazard critical control point.

Use the records that are provided on these tear sheets only if the chart or graph will fit the plant's operations. Attach any additional charts and graphs to the tear sheets for Step 7.

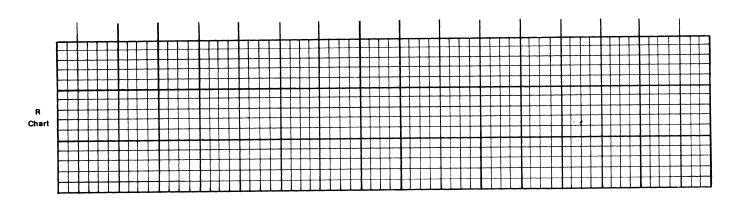
Figure 5: Formulation and Processing Procedure

| Est No. | | _ Product | | | |
|------------------------------|-------------------------|------------------|--|--|--|
| Date | | | | | |
| Formula: | | A | | | |
| Meat/Meat By-Products & Wt. | Binders/Extenders & | Wt. | Spices/Flavor & Wt. | | |
| | | | | | |
| Curing materials | | | | | |
| | Water/ice Batch Wt. | • | Approximate Wt. of Total Protein in Each Batch | | |
| Method of Preparation: | | | | | |
| Smoking/Cooking Cycle: | | | | | |
| Hours Temp. Humidit | y Finish internal Temp. | Smoke/Cook Shrin | k Cooler Shrink | | |
| ingredient(s) Statement | | | | | |
| Approved Labeis: Name & Type | pproval Number | Date | Temp. or Final | | |
| | | | | | |
| | | | | | |

Figure 6: Shewhart Control Chart



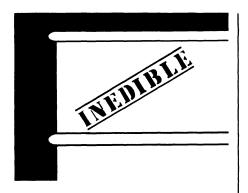
Time



| Date | | | |
|-------|------|------|--|
| Shift | | | |
| | | | |

Sample Size ____

Step 8—Handling Product Marked Inedible



During the processing of meat and poultry products, raw materials or processed products may inadvertently be dropped on the floor or exposed to conditions which make them insanitary. If these materials are intact units, it may be possible to reclaim the raw materials. Reclaiming meat or poultry might involve trimming of exposed surfaces or washing the affected parts under special conditions. On the other hand, the plant may establish a policy in its system which would designate as inedible all raw materials which are exposed to insanitary conditions.

Another situation arises when the plant receives a returned product. The system should discuss how a returned product is to be handled. When returned goods are received that have been packaged in retail containers, the system should identify the method for the inspection and disposition of these returned goods.

When all returned goods and materials exposed to insanitary conditions during processing are considered inedible, the plant must provide satisfactory safeguards to ensure they will not be sold as human food. The USDA inspector does not have to be notified.

This tear sheet offers guidelines for a policy statement regarding the handling of inedible materials. Space is also provided for the policy on returned goods and inedible materials. The following guideline is offered for handling product marked "inedible":

It is the plant's responsibility to denature inedible food so that its use as edible would be precluded. Furthermore, to ensure thorough denaturing, the process of denaturing will be done either by: (a) on a maximum of 50 pounds material or (b) as the inedible food is generated. If the material to be denatured is protected (i.e., returned goods), the protective covering (i.e., retail packaging, shipping container, strippable casing, etc.) must be removed or altered so that the denaturant will come into intimate contact with the inedible material.

| The plant's policy toward inedible material is |
|--|
| |
| |
| |
| |
| |
| |
| |
| |
| |
| The plant's policy toward returned goods is |
| |
| |
| |
| |
| |
| |

Step 9—Keeping the Plant Clean



Plant sanitation is important because only clean facilities produce clean products. Three levels of cleanliness exist in food processing plants: physical, chemical, and microbiological. Each level of cleanliness requires special procedures. Only chemicals can produce microbiologically clean facilities. Yet, sanitizers are not substitutes for physical cleanliness.

Cleaning compounds vary according to the kind of soils encountered. For instance, the following

schedule for cleaning compounds might be used:

Heavy soils Strong alkaline cleaners
Lighter soils Mild alkaline cleaners
Light soils Neutral cleaners
Mineral build-up and hard water . . . Acid cleaners

These descriptions of sanitation offer a way to generalize clean-up procedures without creating a paperwork burden.

The sanitation monitoring section of the quality control system can be expressed as five broad concerns:

- 1. Preoperative inspection;
- 2. Operational inspection:
- 3. General facilities inspection;
- 4. Personal hygiene; and
- 5. Pest control.

Sanitarian:

Each of these concerns must be addressed separately. The extent

of the write-up will depend upon the complexity of the plant, use of automated systems (clean-in-place), critical nature of the product, number of shifts operated in the plant, use of sanitation monitoring programs (microbiological), and other similar factors.

The sanitation write-up must discuss the safeguards to control any product which might become contaminated or adulterated through the misuse of compounds, presence of pests, act by an employee, or other similar causes. This safeguard might entail the closing down of a production department and retention of all product associated with the situation. The general guideline is: Sufficient control must be exercised to prevent the shipment into commerce of any adulterated or misbranded products. The rewards for good sanitation programs include a reduced rate of returned goods, fewer customer complaints, and reduced chances of foodborne illness.

The following guidelines are offered for documenting the sanitation program. The guidelines may be supplemented by drawings, diagrams, systems, or proprietary materials furnished by suppliers of sanitation equipment and supplies.

| Designated person | | | | |
|-------------------|--|--|--|------|
| Authority | | | | |
| Training | | | | |
| Updating | | | | |

Plant improvement program:

Use of formal procedure....

Figure 7: Piant Maintenance Record

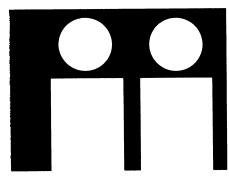
| Date | Deficiency(s) | Corrective Action | Proposed Completion Date |
|------|---------------|-------------------|--------------------------------|
| | | | |
| | | | |
| | | | |
| - | | | |
| | | | |
| | | | |
| | | | |

| Environmental control: | | Product contamination control: | |
|--|---|--------------------------------------|---|
| Ventilation system: | | Maintenance activity: | |
| Air flow: | | Food contact surfaces/product: | |
| Cleaner area to less clean areas | | During processing shift | |
| Filtration of outside make-up air | | Before/after processing shift | |
| Condensation control: | | Use of lubricants/oils | |
| | П | Personnel ingress/egress: | _ |
| Devices | | | |
| Procedures | | Head coverings | |
| Traffic control: | _ | Outer clothing | |
| Equipment | | Cleaning instructions/schedules: | |
| Personnel | | Frequency: | _ |
| Temperature control | | Equipment | |
| Pest control: | | Facilities | |
| Inside areas: | | Acceptance/rejection criteria: | |
| Processing areas | | Raw materials | |
| Non-processing areas | | Processed products | |
| Inedible areas | | Facilities | |
| Outside premises: | | Welfare/locker areas | |
| Used equipment | | Personal hygiene: | |
| Refuse control: | | Personal effects: | |
| Dumpsters | | Aprons/protective devices | |
| • | П | Implements | |
| Incinerators | | Footware | |
| Roadways: | | | |
| Dust | | Cleaning/storage | |
| Surface drainage | | Outer garments: | |
| Loading docks | | Traffic between raw/processed areas | |
| Grass/weeds | | Gloves | |
| Maps (on file): | | Practices: | |
| Bait stations | | Instructions/posters | |
| Water supply: | | Hair/beard coverings | |
| Sources | | Jewelry/cosmetics | |
| Distribution | | Buttons/badges | |
| Nonpotable | П | Hand washing/sanitizing | |
| Potable: | _ | Spitting | |
| Ongoing certification on file | | Rashes/sores/infections/cuts | |
| Changes | | Colds/medical problems | |
| 3 | | Habits: | |
| Chemicals: | | Tobacco: | |
| Statement that chemicals are on the approved | | | |
| list | | Smoking | |
| | | Chewing | |
| | | Chewing gum | |
| | | | |
| | | (Other) | |
| | | | |
| | | (Other) | |
| | | Ongoing: | |
| | | Light bulbs/fixtures/sleeves/shields | |
| | | (Other) | |

Fig

| DAILY SANITATION REPOR | RT | | ESTABLISHMENT NAME | EST. NO. | DATE |
|--|------------------------|----------------------------|--|---|---|
| | | | | | |
| nder the abbreviations "Praye begun), record as approp | e-Op." (oriate the | Observations following coo | made prior to the start of operations) and des: "N.O." (Not Observed), "Ac." (Accept | d "Oper." (Observation table), "Def." (Deficienc | s made after operations y (s)). |
| GENERAL AREA | PRE- OP | OPER, | REMARKS (Enter "General Area" No., specific de of deficient areas, equipment, et | escription c.) | ACTIONS TAKEN AND DOWNTIME (Enter "General Area" No., |
| . Receiving | | | | | |
| . Outside Premises | | _ | | | |
| . Floors | | | | | |
| . Walls | | | | | 1800 P. 1917 P. 1917 |
| i. Windows, Screens, etc. | | _ | | | |
| 5. Ceilings and Overhead Structures | | _ | | | |
| 7. Doors | | | | | |
| . Rails | | | | | |
|). Equipment: | | | | | |
| a. Product Zone | | | | | |
| b. Nonproduct Zone | | | · | | |
| | | | | | |
| O. Freezers and Coolers | | | | | |
| 1. Ice Facilities | | | | | |
| 2. Dry Storage Areas | | | | | |
| 3. Lights | | | | | |
| 4. Welfare Facilities | | | | | |
| 5. Employee: | | | | | |
| a. Dress | | | | | |
| b. Hygiene c. Work Habits | | | | | |
| 16. Handwashing and Sanitizing | | | | | |
| 17. Rodent and | | | | | |
| Insect Control | | | | | |
| 18. General Housekeeping: | | | | | |
| a. Production Area | | | | | |
| b. Nonproduction Area | | | | | |
| 19. Production | | | | | |
| Practices | | | | | |
| 20. Other | | | | | |
| | | | | | |
| ESTABLISHMENT OFFICIAL SI | GNATURE | | | | |
| | | | | | 1 |

Step 10—Corrective Action



Corrective action should treat the cause of the problem, not merely its effects. The safeguards to prevent distribution into commerce of adulterated or misbranded product are, of course, critical, but the emphasis should be on long-range prevention rather than short-range control.

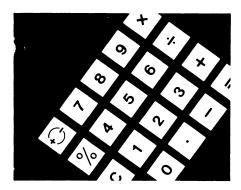
To be effective, corrective action must take into account the symptom, the cause, and the remedy. Two separate activities are involved. The first, which relates symptom to cause, is diagnostic. The second, remedial, relates cause to remedy. The diagnostic activity might consider whether the cause of the problem is controllable by the management or by the employee. The remedial activity might consider the choice of alternatives, deal with resistance to

change, and set up problem-solving on a project-by-project basis.

Since the plant's corrective action procedures may be largely unwritten, it will be necessary to record these procedures. This act may involve interviews with key employees who are responsible for making changes and taking action. Step 6, plant hazards, can be used as a guideline to locate the control points where corrective action will be necessary. List on the tear sheet for step 10 the procedures that are currently used to correct undesirable situations in the plant.

| | Situation | Control Point | Corrective Action |
|----|-----------|---------------|-------------------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |

Step 11—Statistical Procedures



In the manufacture of high-volume items, including food products, it is neither physically nor economically feasible to scrutinize each item produced by the system. Moreover, the examination and analysis of such food items as hermetically sealed products is usually destructive to the "fitness for use" of the items. These facts make statistical quality control all the more important to the production of food products.

With statistical quality control, it is possible to examine a small portion of the production and make decisions about the production as a whole. Examinations may be at control points that enable adjustment of the process if it is drifting toward undesirable features. Thus, statistical quality control can reduce the incidence of unwanted products.

These statistical procedures may also be used to make decisions about the "fitness for use" of vendors' products. As with the scrutiny of items during production, the cost of scrutinizing each item of raw material received by the plant is prohibitive. However, vendors' deliveries may be accepted or not accepted based upon supplier quality control.

Statistical quality control does not have to be a complicated procedure, manageable only by highly trained individuals. Close attention to a few basic measurements, charts, and graphs can yield simple controls that rival many of the sophisticated systems. The procedures and calculations necessary to maintain control charts and other similar records are easily learned. It is possible to obtain many of the values which are related to statistical procedures in pre-calculated tables.

Hand-held, inexpensive pro-

grammable calculators make it possible for employees to compute values with a high degree of accuracy. Combined with the appropriate charts and graphs, these computations are "early warning" indicators of production trends in the plant's processes. Observation of these indicators and trends, coupled with responsive corrective action, serves as a tracking system for the economic control of quality.

Listed below are several sources of information related to quality control. Other sources are available and the list below does not imply endorsement over any other similar, or equally effective material. If any of the materials listed below are needed to complete the quality system, these materials may be obtained from the sources, usually for a fee.

American Society for Quality Control 230 W. Wells Street Milwaukee, Wisconsin 53203 (414) 272-8575

- ANSI/ASQC A1-1978 Definitions, Symbols, Formulas and Tables for Control Charts.
- ANSI/ASQC A2-1978 Terms, Symbols and Definitions for Acceptance Sampling.
- 3. ANSI/ASQC A3-1978 Quality Systems Terminology.
- ASQC C1-1968 Specifications of General Requirements for a Quality Program.
- 5. ANSI/ASQC Z-1.15-1979 General Guidelines for Quality Systems.
- 6. Glossary and Tables for Statistical Quality Control.
- 7. How to Evaluate a Supplier's Product.
- 8. How to Establish Effective Quality Control for the Small Supplier.
- 9. Product Recall Planning Guide.

The Food Processors Institute 1133 20th Street, NW Washington, DC 20036 (202) 331-5919

 Control of Critical Points In Food Processing—A Systems Approach.

American Press Boston, Massachusetts

 Laboratory Manual for Meat Science by Smith, King & Carpenter.

The Ohio State University Animal Science Department 2029 Fyffe Road Columbus, Ohio 43210

- Quality Control of Post Mortem Muscle Tissue.
 - Vol. 1-Meat and Additives
 - 2—Environmental Control
 - 3—Carcass Quantity, Quality and Color Evaluation
 - 4—Microbiology
 - 5—Tables
- 13. Meat Processing.
- 14. Chemistry of Meat Tissue.
- 15. Statistical Sampling Principles.

Superintendent of Documents U.S. Government Printing Office Washington, DC 20402 (202) 783-3238

- Military Standard 105-D, Sampling Procedures and Tables for Inspection by Attributes.
- 17. Military Handbook H-53, Guide for Sampling Inspection.
- HEW Publication No. (FDA)
 79-2115, 2118 and 2119, More
 Than You Ever Thought You
 Would Know About Food Additives, Part I, Part II and
 Part III.
- Consumer Product Safety, Responsive Business Approaches to Consumer Needs, U.S. Department of Commerce, Office of Consumer Affairs.
- Inspecting Incoming Food Materials (Visual Aid and Checklist), Stock No. 017-012-00238-2.

Council for Agricultural Science and Technology 250 Memorial Union Ames, Iowa 50011 (515) 294-2036

21. Foods From Animals, Quantity, Quality and Safety, Report No. 82.

American Meat Institute P.O. Box 3556 Washington, DC 20007 (703) 841-2400

- 22. Meat Plant Sanitation.
- Good Manufacturing Practices, Precooked Fresh and Cured Cooked Beef.
- 24. Good Manufacturing Practices, Fermented Dry and Semi-Dry Sausage.

Meat and Poultry Inspection Program Food Safety and Inspection Service U.S. Department of Agriculture Washington, DC 20250

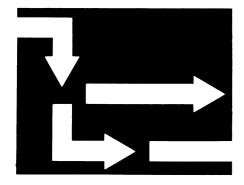
- 25. Meat and Poultry Inspection Regulations.
- 26. Meat and Poultry Inspection Manual.
- 27. Unit I, II & III, TQC Manuals, Denton, TX.

Small Business Administration P.O. Box 15434 Ft. Worth, TX 76119

28. Setting Up a Quality Control System, Management Aids No. 2.012.

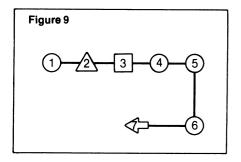
Grocery Manufacturers of America, Inc. 1010 Wisconsin Avenue, NW Washington, DC 20007 (202) 337-9400 29. Recall Manual.

Step 12—Process Flow Chart



A process flow chart diagrams a plant's processing procedures—from receiving the raw materials to manufacturing the finished product. The process flow in the quality control system can be described through the use of words, boxes, or a schematic drawing. This summary of the plant's activities and processes should clearly identify process control points. The size and complexity of the plant's operations will determine how extensive and detailed the flow chart should be.

Other, more extensive, operations might be described through a series of keyed configurations or symbols:



Key: ○ = Operation activity

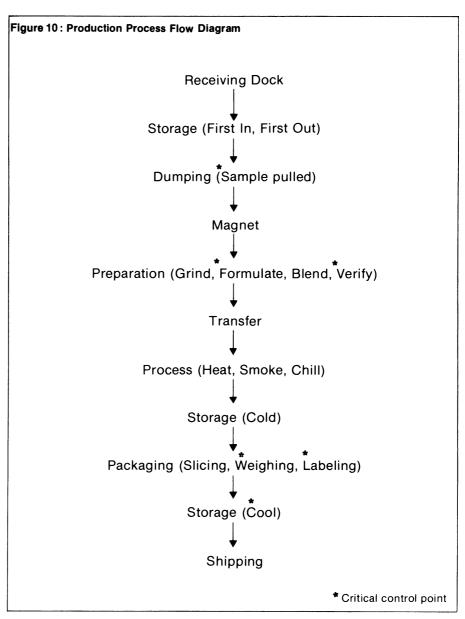
 \triangle = Inspection

☐ = Storage

- 1. Receiving dock
- 2. Incoming inspection
- 3. Receiving storage
- 4. Defrosting
- 5. Tempering
- 6. Nonmeat ingredients control
- 7. Conveyor to blending room

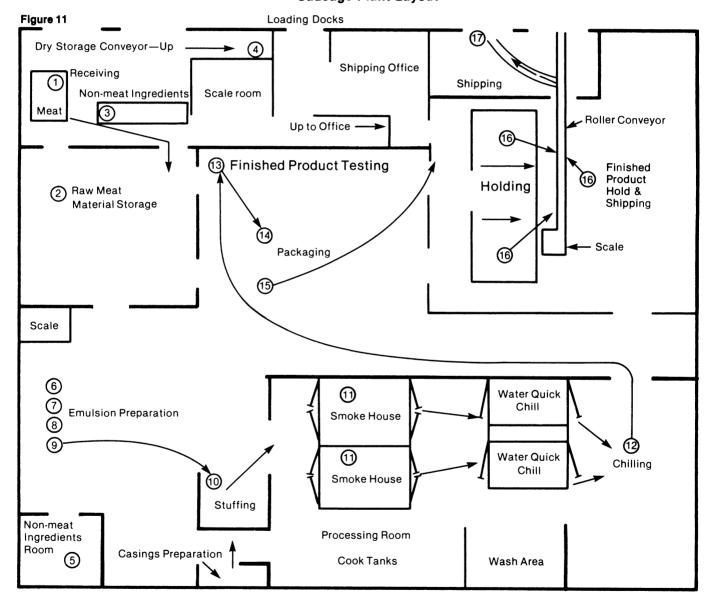
If several different generic processes occur in the plant, it may be difficult to show the process flow on a single chart. One method that might be used for these situations is to show the process flow for each product by a series of transparent overlays affixed to the blueprint of the plant's floor plan.

A fairly simple outline of the operations in a small processing plant which produces only one or two mainline products might be described as follows:



Still other operations might be shown by blueprints or engineer's drawings of the plant's activities:

Sausage Plant Layout



Develop or attach a copy of the plant's process flow plan. The blue-print used to obtain the original Grant of Inspection for the processing facility may be all that is necessary.

Use the 12 tear sheets as the basis for assembling the quality system. If these notes fail to cover all meat and poultry products produced by the plant, use procedures similar to those in Step 6 to outline the missing products and processes.

Reconsider the strategy for the system and how much detail may be necessary to describe the plant's procedures. It is possible to record everything in one manual, however, separate manuals might be developed for the policies, procedures, and methods.

Written procedures communicate information about quality to employees, vendors, customers, and other interested persons. The larger the plant, the more extensively these communications should be documented.

The format used for the written procedures can reduce the paperwork burden. Use of flow charts, graphs, diagrams, and tables can go far to reduce paperwork. Remember, these procedures should answer: what, when, where, how, who?

All written procedures should have numbered, and if possible, dated pages. Management can give active, rather than passive support to the procedures by providing an authorization block on each page for the plant officials who are responsible for the quality system. The authorization block may represent approving as well as reviewing officials' signatures.

Begin the write-up of the system by using the process flow chart, Step 12, as a guide. The ground rule is: Describe the system as it exists today, and not as it will be in the future.

First, describe what is received at the receiving dock; when, where, and how it is received, and who does it. The details regarding the receiving records (log), tests, control points, deficiencies identified, limit of acceptability, and corrective action describe the receiving activity.

The next activity might be the storage of incoming supplies. How is this activity managed? What safeguards are used to assure the freshness of supplies? How are non-food items kept separate from food items? Which supplies require an ongoing

inventory and possibly an active security check? Is the inventory manual or computerized? Following the receiving dock and incoming storage outline, it may be easier to take each product and describe its processes step-by-step through the plant when several different classes of products are handled. If the plant's products are produced by essentially the same generic process, it may not be necessary to divide the process into a product-by-product activity.

Of course, all the plant's automated recording devices and continuous systems should be described at the point in the process where control measures actually occur. These examples of high technology lend a time dimension to the process controls. It may be possible to use proprietary material to show how these controls function. They may be added as appendices, attachments, or supplements.

If the description of the plant's processes is separated into step-by-step procedures, product-by-product, it is usually possible to merge these activities later in the system. The process flow might be merged at the point of packaging or during storage prior to shipping. However, when shipping is unique or different for each class of products, it may be necessary to retain the separation of the process flow throughout the distribution channels.

Once the processed products leave the plant, the quality system can continue to function. While Government regulations usually are concerned with control of the product during its manufacture and storage on the plant premises, the ability to trace products through shipping records is important both to the plant and the regulatory agency. The plant's system should go beyond Government concerns at the point of distribution and consider product durability and shelf-life. The success of these measures depends on the advance planning and cooperation with purveyors to assure customer satisfaction. Certainly, because the packer's label bears the burden of product liability claims and the product reputation, the area of product handling by wholesalers also should be audited.

The next step in developing a quality system is to discuss the procedure for returned goods. This topic is mentioned in Step 8, "Handling Product Marked Inedible." If goods are returned to the processing plant, these safeguards that are taken to control the disposition of these products should be described in detail. The notes associated with Step 8 outline a general statement that may be made regarding disposition of returned goods. If these products are reclaimed in any manner-for example, the use of stale hams in sausage-the general statement in Step 8 will be inadequate.

The regulations governing USDA's voluntary total quality control inspection program do not require disclosure of proprietary information. Only those facts and figures that affect the plant's ability to comply with the federal regulations need be cited. The establishment must submit:

- 1. A letter signed by the plant owner/ operator which states:
 - Company's purpose for seeking approved quality control;
 - Company's commitment to adhere to the system as approved;
 - —Company's data will be maintained and available to USDA;
 - Company's quality control personnel have the authority to halt production/shipping of noncompliant products; and
 - —Company's management will be available for consultation any time USDA considers it necessary.
- An organization chart showing that the quality control section (except in small plants) reports to an official independent of production responsibilities.
- A list of the meat and poultry inspection regulations applicable to the plant's operations.
- Detailed information outlining how the system will function, including:
 - -Raw material control;
 - -Critical control points;
 - Nature and frequency of plant tests (quality control designee to perform tests);
 - Nature of charts and other records kept;

- How long the records are kept;Nature of deficiencies the system is designed to identify and control;
- -Boundaries of limits used to control the system; and
- -Points where corrective action will occur and the nature of the corrective action.

After a rough draft of the quality system has been developed, the following checklist can be used to review the system for completeness.

| | · · · · · · · · · · · · · · · · · · · | | |
|--|---------------------------------------|--|------|
| Purpose for requesting quality control | | Handling finished products: | |
| Commitment to quality control | | What's handled | |
| Records available to USDA | | Who handles it | |
| Authority to halt production/shipping | | How it's handled | |
| Available to talk with USDA | | Controls for handling it | |
| Signed by plant management | | Corrective action to be taken | _ |
| List of regulations: | | Records to be kept | |
| MPI Regulations applicable to the plant | | Storage: | |
| operation | П | Facilities | |
| Organizational chart: | | Critical control points | |
| Persons responsible for quality control | П | How are conditions controlled | |
| Chain of command (positions, names not | | Corrective action to be taken | |
| necessary) | | Shipping: | |
| Number of persons working in quality | | · · · · · | |
| control | | How product is shipped | |
| Number of persons working in production | | Controls to assure adequate protection Corrective action to be taken | |
| department | | Records to be kept | |
| No conflict in the role of quality control | | Inedible/returned goods products: | |
| Incoming materials: | | Product sorting | |
| What's received | | Product sorting | |
| Who receives it | | Product denaturing | |
| How it's handled | | Records to be kept | |
| How it's checked | | MPI Inspector to be notified (optional) | |
| Corrective action to be taken | | Stamps/seals/brands: | |
| Records to be kept | | MPI Inspector to be notified | |
| Product preparation: | | Records to be kept | |
| What's processed | | Sanitation: | |
| Who processes it | | Statement that plant uses potable water | |
| How it's processed | | (ongoing certification) | |
| How it's handled | | Plant improvement program on file | |
| Critical control points | | Adequate pest control program | |
| Corrective action to be taken | | Maps/diagrams of traps/devices on file and | لــا |
| Records to be kept | | available for review | |
| Compliance with MPI Regulations: | | Statement that cleaning compounds/agents | |
| Identification of applicable items | | are USDA approved/EPA registered | |
| Target values | | Preoperative/operational program: | |
| Limits | | What's to be done | |
| Action values | | Who's to be dolle | |
| Control charts, graphs, logs, records | | How it's to be done | |
| Corrective action to be taken | | Corrective action to be taken | |
| Records to be kept | | Records to be kept | |
| , | | THE SECOND TO BE REDUCTION. | 1 1 |

Bibliography

| Personal hygiene: | | 1. Federal Meat Inspection Regulations (9 CFR 318.4) |
|--|---|--|
| What's to be done | | and Poultry Products Inspection Regulations |
| Who's to do it | | (9 CFR 381.145). 2. Wheelwright, S.C., "Japan—where operations really |
| How it's to be done | | are strategic," Harvard Business Review, July- |
| Corrective action to be taken | | August 1981. |
| General facilities inspection: | | 3. Deming, W.E., "What Top Management Must Do," |
| What's to be done | | BusinessWeek, July 20, 1981. |
| Who's to do it | | 4. Juran, J.M., "Management of Quality," McGraw-Hill, 1981. |
| How it's to be done | | 5. Ringle, W.M., "The American Who Remade Made in |
| Corrective action to be taken | | Japan'," Nation's Business, February 1981. |
| Records to be kept | | 6. Hayes, R.H., "Why Japanese factories work," Har- |
| Microbiological monitoring | | vard Business Review, July-August 1981. |
| Statement that intensity diagrams, if any, | | Consumer Product Safety, Responsive Business Approaches to Consumer Needs, U.S. Department |
| of control mechanisms are on file | | of Commerce, April 1981. |
| Characteristics of the system: | | 8. Dun's Review, "A New Way to View Consumers," |
| List of plant processed products | | August 1981. |
| Binder, manual or other suitable | | 9. Control of Critical Points in Food Processing, Food |
| organization | | Processors Institute, 1977. 10. Terrell, R.N., "A sausage makers guide to good |
| Pages identified by plant name, plant number | | manufacturing practices," Meat Industry, June 1979. |
| and date | | 11. Smith, King and Carpenter, "Laboratory Manual for |
| Pages numbered consecutively front to | | Meat Science," American Press, 1978. |
| back | | 12. Marriott, N.G., "Sanitation," The National Provi- |
| Pages have active approval/reviewing | | sioner, September 5, 1981. 13. Fundamentals of Quality Control, American Society |
| officials' ID | | for Quality Control, 1981. |
| Suppliers manual | | 14. Golomski, W.A., & Santos, J.J., Food Processing |
| Control of revisions to the system | | Magazine, August 1977. |
| List of laboratory procedures | | 15. Product Recall Planning Guide, American Society |
| ID of sampling plans | | for Quality Control, 1981. 16. Schonberger, Richard J., "Japanese Manufacturing |
| Tests performed off-premises | | Techniques," The Free Press, 1982. |
| Use of test/inspection data | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |
| New employee orientation | | |
| Metrology/calibration testing equipment: | | |
| How it's accomplished | | |
| Traceability to national standards | | |
| Control of environmental/test conditions | - | |
| Product recall procedure | | |
| Product liability prevention | | |
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Applications should be sent to: Administrator, Food Safety and Inspection Service, USDA, Washington, D.C. 20250.

